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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/567,096

02/21/2006

Satoshi Yamamoto

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EXAMINER

ORLANDO, MICHAEL N

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/567,096	Applicant(s) YAMAMOTO ET AL.	
	Examiner MICHAEL N. ORLANDO	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The examiner recognizes the arguments and amendments submitted February 29th, 2008 and hereby withdraws the objections to the specification and the 112 rejections. The claims, however, continue to be unpatentable over the prior art.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-23, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joachimi et al. (US 2003/0125429 A1) in view of Aylward et al. (US 5,998,119) further in view of Andrew (US 3,459,575).

Regarding claim 1, Joachimi et al. teaches a thermoplastic molding composition (thermoplastic resin) and moulded parts produced therefrom, which is laser-transmitting (i.e. transparent) to lasers in the range of 700-1200nm ([0001]) and is used for laser welding ([0001]). The composition is taught to contain inorganic pigments such as titanium dioxide ([0067]) whereby said pigments are added as a colorant and if they absorb in the region of the laser utilized in the laser welding process then they may be used in small quantities so as to allow for at least partial transmission of the laser light ([0067]). Joachimi et al. further teaches that the titanium dioxide utilized can be rutile, which is a natural form of titanium dioxide known to possess a density in the range of 5.5 - 6.5 g/cm³ (at least 4 g/cm³). It is recognized by the examiner that titanium dioxide (rutile) was a well-known pigment at the time of the invention and it was understood that the color of said rutile was a brilliant white. It is also recognized by the examiner that although the composition is not explicitly stated as white, gray or tint color, given the short list of dyes presented by Joachimi et al. it would have been easily understood by one of ordinary skill in the art that said color scheme was easily attainable by utilizing

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the colorants set forth by the invention. It is further taught by Joachimi et al. that the utilization of pigments in the moulding composition is kept at a low level and given the examples of moulding composition mixes disclosed, the pigments are taught to at most account for 0.52 wt% (table 1, examples 1-4). It is recognized by the examiner that 0.52 wt% of the pigment would equate to approximately 0.5 parts by weight of the pigment per 100 parts by weight of the moulding composition.

Joachimi et al. fails to explicitly teach the particle size of the titanium oxide in the range of 100-400nm and also fails to teach that the overall composition has a ratio of 100 parts by weight of a thermoplastic resin to 0.01-3 parts by weight of the titanium oxide. Joachimi further fails to explicitly teach surface treating the titanium oxide particles.

Aylward et al. teaches the use of titanium dioxide in photo imaging paper with the pigment diameter in the range of 0.1-0.26 μ m (i.e. 100-260nm) and preferably utilizing the rutile variant of said titanium dioxide (column 6, lines 25-37).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the titanium oxide in the amount of 0.01-3 parts by weight per 100 parts by weight of the thermoplastic resin in light of the teachings of Joachimi et al. because it was known that if pigments are added as a colorant and they absorb in the region of the laser utilized in the laser welding process then they should be used in small quantities so as to allow for at least partial transmission of the laser light ([0067]) and furthermore the explicit examples taught by Joachimi et al. indicate that other such pigments are utilized in the range of approximately 0.5 parts by weight of the pigment

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per 100 parts by weight of the thermoplastic resin (table 1, examples 1-4). It would have also been obvious to one of ordinary skill in the art at the time of the invention to modify the invention taught by Joachimi et al. and use titanium dioxide with an average particle size (i.e. diameter) in the range of 100-260nm in view of Aylward et al. because it was known that using particle sizes in said range allows for sufficient opaqueness rather than an undesired lack of opaqueness (less than 100nm) or increase in yellowing (over 260nm) (column 6, lines 30-37). It is recognized by the examiner that in order to obtain a whitish/opaque laser-transmitting composition it would have been recognized by one of ordinary skill in the art that the particle sizes taught by Aylward et al. should be preferentially utilized.

Andrew discloses surface treating titanium oxide particles with aluminum oxide (i.e. alumina; column 2, lines 30-35).

It would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the composition of Joachimi to further include surface treating the titanium oxide particles in view of Andrew for the purpose of imparting desired, essential color, durability and non-yellowing characteristics to the pigment (column 2, lines 30-35).

Regarding claim 2, the composition of claim 1 is taught as seen above. There is no specific reference by Joachimi et al. in regards to the refractive index of either of the thermoplastic resin or the titanium dioxide; however, it was well known in the art at the time the invention was made that rutile (a common form of titanium dioxide) has an extremely high refractive index (2.60+) that would exceed the refractive index of the

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thermoplastic resin therefore leading to an n_1 - n_2 that is inherently greater than 1.0. It is taught by Joachimi et al. that the laser-transparent plastics can include polyamides, polypropylene and polycarbonate ([0027]-[0028]), which were all well-known in the art to have refractive indexes in the range of 1.5-1.6. Given the teachings of the above mentioned laser-transparent plastics and the rutile (titanium dioxide) colorant, it is clear the invention taught by Joachimi et al. would have resulted in n_1 - n_2 as greater than 1.0 and $1.4 < n_2 < 1.7$.

Regarding claim 3, the composition of claim 1 is taught as seen above. Joachimi et al. further teaches that the laser-transmissible resin (laser-transparent plastic) can be composed of polycarbonate or polypropylene ([0027]-[0028]).

Regarding claim 4, the composition of claim 1 is taught as seen above. It is further taught by Joachimi et al. that the utilization of pigments in the moulding composition is kept at a low level and given the examples of moulding composition mixes disclosed the pigments are taught to at most account for 0.52 wt% (table 1, examples 1-4). It is recognized by the examiner that 0.52 wt% of the pigment would equate to approximately 0.5 parts by weight of the pigment per 100 parts by weight of the moulding composition. The pigments disclosed in the examples (perinone, anthraquinone, pyrazolone) are all organic dyes that are inherently laser-transmissible for laser lights in the range of 800nm-1200nm.

Regarding claims 5 and 6, the composition of claim 1 is taught as seen above. Joachimi et al. further teaches that the composition may also contain fire retardants (i.e. flame retarders), mica, calcium carbonate or glass fibers ([0037]-[0038]).

Regarding claims 7-12, the claims are substantially similar to claims 1-6 and differ in that claims 1-6 are drawn to a composition and claims 7-12 are drawn to a workpiece molded out of said composition. It is taught by Joachimi et al. that the thermoplastic moulding composition discussed above can be produced into moulded parts (i.e. a workpieces) and can be bonded to other moulded parts by laser transmission welding ([0085]).

Regarding claim 13, the workpiece of claim 7 is taught as seen above. Joachimi et al. fails to explicitly teach the whiteness degree being at least 80.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve said whiteness degree given that the limitations of the invention have been already been disclosed in the prior art (Joachimi et al.) and one of ordinary skill would have been able to utilize the invention disclosed by Joachimi et al. and in so desiring, would have understood how to mix the white colorants and in particular rutile as discussed above in a manner to attain to such a hue without parting from the scope of the invention.

Regarding claim 14, the workpiece of claim 7 is taught as seen above. It is specifically taught by Joachimi et al. that the moulding composition (used to mould the workpiece) has a transmission in the NIR (700-1200nm) of preferably greater than 30% ([0022]). Also, it would have been recognized by one of ordinary skill in the art at the time the invention was made that the teachings of Joachimi et al. are based upon the workpiece being laser-transmissible ([0020]).

Regarding claims 15-22, the claims are substantially similar to claims 7-14 and differ in that the claims have incorporated the workpiece being actively used in a laser welding process whereby the laser-transmissible workpiece is piled upon a laser-absorbing workpiece and then irradiated with a laser beam to weld the two thermally. It is taught by Joachimi et al. that the thermoplastic moulding composition discussed above can be produced into moulded parts (i.e. a workpieces) and can be bonded to other moulded parts by laser transmission welding ([0085]). Furthermore the method of laser welding is taught by Joachimi et al. to include the laser penetrating the first component, which is sufficiently transparent to the laser (transmissible) and then the laser light is absorbed by the second component (laser-absorbing) and heat is generated which leads to melting at the contact zone and bonding of the two components ([0007]).

Regarding claims 23 and 26, the claims hinge around the laser absorbent workpiece being of substantially the same whiteness degree as the above mentioned laser-transmissible workpiece and also being absorbent to the laser light in the range that the laser-transmissible workpiece is transmissible to the laser light.

It was well-known to those of ordinary skill in the art at the time the invention was made that the second workpiece used as the absorption layer must absorb the laser light in the range that the transmissible layer allows it to pass, otherwise the laser welding process would be inefficient or impossible. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to achieve said whiteness degree given that the limitations of the invention have been already

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been disclosed in the prior art (Joachimi et al.) and one of ordinary skill would have been able to utilize the invention disclosed by Joachimi et al. and in so desiring, would have understood how to mix the white colorants and in particular rutile as discussed above in a manner to attain to such a hue without parting from the scope of the invention. Also, as discussed above, a preferred characteristic of the invention taught by Joachimi et al. was to create two moulded parts that exhibit similar optical appearance in terms of color (i.e. same whiteness degree) ([0020]). The subsequent laser welding for the moulding composition taught by Joachimi et al. was meant to be carried out in the range of 700-1200nm as was consistent with the laser-transmissible moulding composition ([0022]). It is recognized by the examiner that Joachimi et al. does not teach the wavelength range of 800-1200nm, but it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize said range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ)

Regarding claim 25, the method of claim 23 is taught as seen above.

Furthermore it was recognized by Joachimi et al. that carbon black could be used as the laser-absorbing component ([0014]).

5. Claims 24, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joachimi et al. (US 2003/0125429 A1), Aylward et al. (US 5,998,119) and Andrew (US 3,459,575), as applied to claim 23 above, further in view of Savitski et al. (US 6,596,122 B1).

Regarding claim 24, 27 and 28, the method of claim 23 is taught as seen above. As discussed above in claim 23 Joachimi et al. teaches the whitish resin, the need for both a laser-absorbent layer and laser-transmissible layer and the desire to create two optically similar (i.e. both layers are same color) layers. Joachimi et al. further teaches the need for the absorptive layer and transmissible layer to be functional for laser light wavelengths in the range of 700-1200nm as is also discussed in claim 23 above. Further disclosed by Joachimi et al. are the teachings that absorption and thus conversion of laser light into heat (i.e. laser welding) can be controlled by means of pigments, filler, and other additives indicating that it was known at the time of the invention that the addition of other additives can be used as a means to increase the absorption of the absorptive layer if so is desired without parting from the scope of the invention.

Joachimi et al. fails, however, to explicitly teach the whitish resin material applied to the laser-absorptive layer as either a film, an ink or a paint despite the fact that it would have been recognized that the absorbent layer must be absorbent in the wavelength range of 700-1200nm to function as a proper laser-absorbing member in the invention taught by Joachimi et al..

Savitski et al. teaches a method for joining plastic materials whereby the bonding of the materials occurs by passing radiation through one or more transmitting materials and into a radiation absorbing material (i.e. laser welding), which in turn generates heat and effects the bond. (column 1, lines 14-20). The method further defines radiation as consistent of a wide variety of lasers some of which include YAG and carbon dioxide

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lasers (column 6, lines 35-39). It is further taught by Savitski that a wide variety of combinations of transmitting and absorbing materials can be made that includes emulsions of pigments (i.e. whitish resin) readily painted onto interface materials or using the absorbing material as a thin film as two such methods of generating the absorbing material (column 4, lines 1-19).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the resin taught by Joachimi et al. in such a manner as that disclosed above by Savitski et al. since it was known that absorbing materials can be constructed in numerous ways extending beyond merely moulding them into a workpiece and it would have been understood that these uses were interchangeable and could be preferentially utilized dependent on the immediate needs of the user.

Response to Arguments

1. Applicant's arguments, filed February 29th, 2008, with respect to the Baumann reference have been fully considered and are persuasive. The alternative claim 1 rejection utilizing Baumann has been withdrawn.

2. Applicant's arguments filed February 29th, 2008 have been fully considered but they are not persuasive outside of that pertaining to the use of Baumann as prior art.

Applicant contends that the references Joachimi and Aylward do not teach all the features of claims 1-23, 25 and 26 with a specific argument that the art of reference does not provide surface treated titanium oxide particles.

The examiner disagrees and points out that as provided above in the office action all the features that were originally claimed were either taught or suggested in the prior art. The addition of a surface treatment is shown to be taught by Andrew as presented above.

Applicant contends that the rejections of claim 24, 27 and 28 do not teach all the features.

The examiner disagrees and points out the office action teaches that the limitations of claims 24, 27 and 28 not addressed by the rationale for claim 23 rejection earlier in the office action are taught by Savitski and such are obvious. The examiner notes that the claim rejections are further in view of the teachings provided in claim 23 (i.e. Joachimi and Aylward) it is merely a typographical error that the name Baumann appears since it is clearly presented in the preceding claims that Baumann is clearly not associated with claim 23 (which is the claim from which 24 depends). Baumann was only shown to teach claim 1. Joachimi and Aylward present the teachings for claim 23 and the limitations beyond claim 23 (i.e. claim 24, 27 and 28) are taught by further viewing Savitski.

3. Applicant's arguments with respect to addition of surface treating the titanium oxide particles on February 29th, 2008 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **MICHAEL N. ORLANDO** whose telephone number is (571)270-5038. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm, alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip C. Tucker can be reached on (571) 272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MO

/Philip C Tucker/

Supervisory Patent Examiner, Art Unit 1791